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REMARKS/ARGUMENTS

The Examiner has indicated the allowability of claims 4 and 6 which have been rewritten as new claims 7 and 8. In addition claim 1 has been revised to further define the Grinding Ball in terms of its possessing conditions to thereby define grinding ball characteristics different from that of the cited prior art.

The Examiner has cited US Patent 4,221,612 against claims 1-3 and 5. Thome teaches a white cast iron chemistry having significant chromium residue, carbon and rare earth element content for the grinding ball. This chemistry permits a formation of a grinding ball having a hard martensitic shell where the ball is quenched in forced air. The composition in the form of a rod is forged at a first temperature in the range of a 1000°C to permit forging of the rod into individual slugs that can be formed into balls. The slugs are heated to a temperature in the range of 1,153°C and are forged into balls. The ball is then quenched by air cooling to a temperature of 700°C, reheated to 950°C, and then oiled, and tempered to a hardness of 650BH. The balls are then subsequently annealed at a temperature range of 490° C to give the final structure which has a significantly reduced hardness in the range of 550 to 600BH.

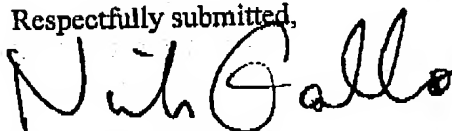
Two important distinctions between the Applicant's claimed grinding ball and the Thome technology are evident. First, Applicant's grinding ball retains its hardness during the stress relief step. Second, the partial stress relieving is carried out at the equalization temperature of the grinding ball and not some higher temperatures as taught by Thome. These significant differences in the process produce a grinding ball having significant benefits. These processing steps reduce the circumferential internal compressive stresses in the outer martensitic shell to stabilize the ball against breakup as caused by balancing tensile stresses in the pearlitic core exceeding the tensile strength of the core. The grinding ball in the prior art does not have this structure because it is annealed at a higher temperature, which results in a reduction of the hardness of the outer shell. It is therefore submitted that new claim 1 defines the Grinding Ball in terms that distinguish from the prior art.

In view of the above, favorable re-consideration of this application is requested.

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It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

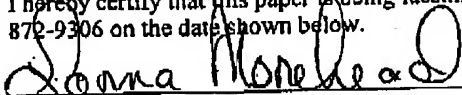


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CERTIFICATION OF FACSIMILE TRANSMISSION

I hereby certify that this paper is being facsimile transmitted to the US Patent and Trademark Office at Fax No. (703) 872-9306 on the date shown below.



Lorna Morehead

April 20, 2004
Date

CLT01/4642578v1